requests that all outstanding objections and rejections be reconsidered, and that they be withdrawn.

Election/Restrictions

2. The Examiner restricted the application to one of three (3) inventions with claims 1, 3, 25 and 44 deemed generic. Applicant affirms the election made on May 2, 2002 in which Applicant elected without traverse to prosecute the invention of Group I (claims 45-51) and Group II (claims 2, 4-24 and 26-29). Claims 30-43 were withdrawn by the Examiner from further consideration for being drawn to a non-elected invention. By the foregoing amendments, claims 30-43 have been canceled without prejudice or disclaimer.

Objections to the Drawings and Specification

3. The Examiner has objected to the drawings and specification for containing subject matter not relevant to the present invention. Claims directed to the particular subject matter have been added as dependent claims in the above Amendments thereby rendering the objections moot. Reconsideration and withdrawal of the rejections is respectfully requested.

Claim Rejections

4. The Examiner has rejected claims 1, 3 and 25 under 35 USC 102(b) as being anticipated by U.S. Patent No. 5,532,944 to Battista (hereinafter "Battista"). The Examiner rejected the remaining claims under 35 USC 103(a) as being anticipated by Battista in combination with various other prior art. Based on the above amendments and following Remarks, Applicant respectfully requests that these rejections be reconsidered and that they be withdrawn.

5. Claim 1 has been amended to recite "a signal measurement system comprising ...a pulse management system configured to automatically perform a series of pulse measurements on a previously-acquired time-varying analog signal comprising a plurality of pulses, samples of which are stored in the acquisition memory, wherein the pulse management system generates for storage in an accessible data structure pulse characteristics of each of the plurality of pulses, wherein for each of the plurality of

pulses, said pulse characteristics comprise results of the one or more pulse measurements."

6. The claimed pulse management system performs a measurement operations on a plurality of pulses of an acquired signal; that is, a signal represented by acquired signal data stored in the acquisition memory of the signal measurement system. As recited in claim 1, such an acquired signal has been received at a channel input of the signal measurement system and quantified and stored in the acquisition memory. In contrast to conventional systems, the present invention consolidates pulse measurements of a plurality of pulses of a previously-acquired signal, and stores the pulse measurements in an accessible database. Other traditional systems performed individual pulse measurements in response to specific actions taken by an operator for a specified pulse displayed on a waveform display. The results of such a single pulse measurement may or may not have been stored beyond that necessary to display the measurement results to the operator. Due to the many thousands of operator actions that would be necessary to invoke a number of traditional pulse measurements on the perhaps thousands of acquired pulses, there has been no attempt heretofore to provide any structure for storing or organizing such measurement data. This enables an operator to perform an extensive, detailed analysis of system and circuit behavior with little or no involvement in the generation of the necessary pulse measurement data to perform such an analysis.

7. The prior art fails to teach or suggest Applicant's invention as recited in amended independent claim 1. For example, Battista discloses a multi-channel analyzer (MCA) for use in a radiation/particle detection device that measures the energy or amplitude of a detected sub-atomic particle. (*See*, col. 1, lns. 15-22.) The Battista device minimizes the effects of baseline shift, pulse pileup and noise thereby increasing the accuracy of the device. (*See*, col. 3, lns. 41-58.) Figure 4 of Battista illustrates the MCA which processes signals generated by a scintillation counter not shown in the Figure. An I/O circuit 68 stores a histogram of the pulse height (energy) of the electrical pulses received into each of the channels during a prescribed time period. (*See*, col. 7, lns. 46-51.) Battista neither teaches nor suggests "automatically performing a series of pulse measurements on a previously-acquired time-varying analog signal comprising a plurality of pulses, samples of which are stored in the acquisition memory" as recited in amended claim 1. In addition, Battista neither teaches nor suggests "generating for storage in an accessible

data structure pulse characteristics of each of the plurality of pulses, wherein for each of the plurality of pulses, said pulse characteristics comprise results of the one or more pulse measurements" as recited in claim 1. In contrast, Battista includes a DSP 64 that processes pulses as they are detected and presents the results of the pulse height analysis to control circuit 66 for display through input/output device 68. There is no suggestion in Battista to perform the above-noted recitations of claim 1. For at least these reasons, Applicant respectfully asserts that claim 1, as amended, is neither anticipated nor rendered obvious by Battista. Accordingly, Applicant respectfully requests that the rejection of claim 1 be reconsidered, and that it be withdrawn.

8. Independent claims 25 and 44 have also been amended to recite features similar to those discussed above.

Claim 25 recites a signal measurement system comprising an element recited in means plus function format: "a pulse management means for automatically performing a series of pulse measurements on a previously-acquired time-varying analog signal comprising a plurality of pulses, samples of which are stored in the acquisition memory, and for generating for storage in an accessible data structure pulse characteristics of each of the plurality of pulses, wherein for each of the plurality of pulses, said pulse characteristics comprise results of the one or more pulse measurements." Similarly, claim 44 recites a method for generating a pulse data structure for storage in a memory apparatus operationally coupled to a signal measurement system, said data structure comprising a plurality of signal pulse characteristics of pulses of an previously-acquired time-varying analog signal samples of which are stored in an acquisition memory of the signal measurement system. The claimed method comprises "1) automatically performing a series of pulse measurements on a previously-acquired time-varying analog signal comprising a plurality of pulses, samples of which are stored in the acquisition memory; and 2) generating for storage in an accessible data structure pulse characteristics of each of the plurality of pulses, wherein for each of the plurality of pulses, said pulse characteristics comprise results of the one or more pulse measurements." Neither Battista nor the other art of record teach or suggest the recitations of claims 25 and 44. For example, Battista neither teaches nor suggests an apparatus or method that generates for storage in an accessible data structure pulse characteristics of each of the plurality of pulses, wherein for each of the plurality of pulses, said pulse characteristics comprise

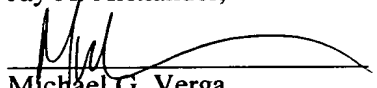
results of the one or more pulse measurements. Accordingly, reconsideration and withdrawal of the rejection of these independent claim is also respectfully requested.

9. Dependent claims 2-23, 24-29 and 45-52 depend directly or indirectly from independent claims 1, 25 and 44 and incorporate all the subject matter of their respective base claim while adding additional subject matter which makes them a fortiori and independently patentable over the art of record. Accordingly, Applicant respectfully requests that the rejection these dependent claims be reconsidered and withdrawn.

CONCLUSIONS

10. In view of the foregoing Amendments, this application should now be in condition for allowance. A notice to this effect is respectfully requested. If the Examiner believes, after entering this paper into the record, that the application is not in condition for allowance, the Examiner is requested to call the Applicant's representative at the number provided below.

Respectfully submitted,
Jay A. Alexander,



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Docket No. 10961066-1
Dated: August 6, 2002

MARKED-UP VERSION OF CLAIMS SHOWING ALL CHANGES MADE

Attachment 1 to the amendment filed in response to the Office Action dated May 14, 2002 in US Patent application 09/686,663

1. (Amended) A signal measurement system comprising:

an acquisition memory; and

a pulse management system configured to automatically perform a series of pulse measurements on a previously-acquired time-varying analog signal comprising a plurality of pulses, samples of which are stored in the acquisition memory, wherein the pulse management system generates for storage in an accessible data structure pulse characteristics of each of the plurality of pulses, wherein for each of the plurality of pulses, said pulse characteristics comprise results of the one or more pulse measurements. [pulse management system configured to perform a plurality of pulse measurements on each of a plurality of pulses of an acquired signal, and to store results of said plurality of pulse measurements in an accessible data structure with substantially no operator involvement.]

2. (Amended) The signal measurement [pulse management] system of claim 1, wherein said signal measurement system comprises an [acquired signal is acquired by a digital oscilloscope and wherein said pulse management system is implemented in said digital] oscilloscope. [to perform said plurality of pulse measurements on said plurality of acquired signal pulses.]

3. (Amended) The [A pulse database generator for use in a] signal measurement system of claim 1, wherein[,] said pulse management system is [database generator] constructed and arranged to perform said series of pulse measurements on said previously-acquired signal automatically and without operator involvement. [process acquisition data of an acquired signal in accordance with measurement parameters to generate pulse characteristic data for storage in a pulse data structure, said pulse characteristic data comprising results of a plurality of pulse measurements applied to a plurality of pulses of said acquired signal.]

4. (Amended) The signal measurement system of claim 1, [pulse database generator of claim 3,] wherein said pulse management system [database generator] comprises:

a histogrammer that samples the acquired signal [acquisition data] to generate at least one histogram, said histogram comprising a distribution of number of occurrences that said acquired signal attained each of a plurality of signal levels over a [certain] specified time range; and

a mode finder that identifies one or more modes of said histogram representing one or more signal levels that occur most frequently in said histogram, each of said one or more modes representing a signal level having a logical interpretation.

5. (Amended) The signal measurement system of claim 4, [pulse database generator of claim 4,] wherein said pulse management system [database generator] further comprises:

a transition calculator that determines a transition signal level at each of one or more transition percentages, wherein each of said one or more transition percentages is a percentage of a difference between two of said signal levels having a logical interpretation.

6. (Amended) The signal measurement system of claim 5, [pulse database generator of claim 5,] wherein said pulse management system [database generator] further comprises:

a data analyzer that processes said acquisition signal sample data to determine transition times at which each of said plurality of pulses [pulse] attains each of said transition signal levels.

7. (Amended) The signal measurement system of claim 6, [pulse database generator of claim 6,] wherein said pulse management system [database generator] further comprises:

a pulse measurement engine that performs said plurality of pulse measurements on said each said plurality of pulses utilizing said transition times and said pulse type indication.

8. (Amended) The signal measurement system of claim 6, [pulse database generator of claim 6,] wherein said plurality of pulse measurements are predetermined.

9. (Amended) The signal measurement system of claim 6, [pulse database generator of claim 6,] wherein said pulse characteristic data further comprises:

results of statistical analyses performed on said pulse measurement results.

10. (Amended) The signal measurement system of claim 6, [pulse database generator of claim 6,] wherein said measurement parameters are provided by the operator.

11. (Amended) The signal measurement system of claim 3, [pulse database generator of claim 3,] wherein said pulse management system [database generator] further comprises:

a transition calculator that determines the signal level at each specified transition percentage based on one or more signal levels for each logical state of the plurality of pulses [pulse] in the acquired signal including at least a top signal level and base signal level, wherein said one or more signal levels are provided by the operator.

12. (Amended) The signal measurement system of claim 4, [pulse database generator of claim 4,]wherein said histogram comprises a table stored in memory that lists the quantity of sampled occurrences said acquired signal attained each of a plurality of signal level value over a certain time range.

13. (Amended) The signal measurement system of claim 12, [pulse database generator of claim 12,] wherein said acquired signal is a voltage signal, and wherein said signal levels represented in said histogram are voltage levels.

14. (Amended) The signal measurement system of claim 4, [pulse database generator of claim 4,] wherein an acquisition memory stores acquisition data pertaining to a plurality of acquired signals, and wherein said measurement parameters includes a source indication that indicates which of said plurality of acquired signals is to be processed by said histogrammer.

15. (Amended) The signal measurement system of claim 4, [pulse database generator of claim 4,] wherein said acquired signal comprises two signal levels having a logical interpretation, and wherein said histogram is nominally a bimodal signal level distribution.

16. (Amended) The signal measurement system of claim 4, [pulse database generator of claim 4,] wherein said measurement parameters includes an indication of the number of signal levels of said acquired signal have a logical representation, wherein said mode finder utilizes said indication to identify a corresponding number of modes of said histogram.

17. (Amended) The signal measurement system of claim 4, [pulse database generator of claim 4,] wherein said acquired signal is an alternate mark inversion communication signal that transitions between three signal values, and wherein said mode finder identifies three modes in said histogram.

18. (Amended) The signal measurement system of claim 4, [pulse database generator of claim 4,] wherein said mode finder implements a smoothing function to identify any of said one or more modes of said histogram that is not well defined.

19. (Amended) The signal measurement system of claim 5, [pulse database generator of claim 5,] wherein said signal levels having a logical interpretation include a top signal level and a base signal level, and wherein said transition calculator determines transition signal levels achieved by each pulse at said transition percentages of the signal transitions between said top and base signal levels.

20. (Amended) The signal measurement system of claim 19, [pulse database generator of claim 19,] wherein said transitional percentages comprise 10%, 50% and 90% of the difference between said top signal level and said base signal level.

21. (Amended) The signal measurement system of claim 19, [pulse database generator of claim 19,] wherein said transition percentages are provided by the operator through a user interface.

22. (Amended) The signal measurement system of claim 1, [pulse database generator of claim 3,] wherein said pulse management system [database generator] comprises:

a transition calculator that determines the signal level at each specified transition percentage based on one or more signal levels for each logical state of the pulse in the acquired signal including at least a top signal level and base signal level, wherein said one or more signal levels are provided by the operator.

23. (Amended) The signal measurement system of claim 7, [pulse database generator of claim 7,] wherein said pulse measurements comprise one or more of the group consisting of rise time; fall time; pulse width; preshoot; pulse area; minimum voltage; maximum voltage; average voltage; volts AC RMS; volts DC RMS; amplitude voltage; base voltage; top voltage; upper voltage; middle voltage; lower voltage; plus width; minus width; positive duty cycle; negative duty cycle; period; phase; frequency; delta time; peak-to-peak voltage; and overshoot.

24. (Amended) The signal measurement system [data structure] of claim 1, [3,] wherein said signal measurement system is a digital oscilloscope.

25. (Amended) A signal measurement system [for analyzing pulses of an acquired signal represented by acquisition data stored in a memory device of the signal measurement system,] comprising:

an acquisition memory; and

a pulse management means for automatically performing a series of pulse measurements on a previously-acquired time-varying analog signal comprising a plurality of pulses, samples of which are stored in the acquisition memory, and for generating for storage in an accessible data structure pulse characteristics of each of the plurality of pulses, wherein for each of the plurality of pulses, said pulse characteristics comprise results of the one or more pulse measurements.

[a computing device having a memory;

a computer-readable medium of instructions that, when executed by said computing device, processes said acquisition data in accordance with measurement parameters to

generate pulse characteristic data for storage in a pulse data structure in said memory, said pulse characteristic data comprising results of a plurality of pulse measurements applied to pulses of said acquired signal.]

26. (Amended) The signal measurement system of claim 25, wherein said pulse management means [computer-readable medium of instructions] comprises:

means for generating at least one histogram of said acquired signal; and

means for identifying one or more modes of said histogram.

27. (Amended) The signal measurement system of claim 26, wherein said pulse management means [computer-readable medium of instructions] further comprises:

means for determining a transition signal level at each of one or more transition percentages, wherein each of said one or more transition percentages is a percentage of a difference between two of said signal levels having a logical interpretation.

28. (Amended) The signal measurement system of claim 27, wherein said pulse management means [computer-readable medium of instructions] further comprises:

means for determining transition times at which each pulse attains each of said transition signal levels.

29. (Amended) The signal measurement system of claim 28, wherein said pulse management means [computer-readable medium of instructions] further comprises:

means for performing said plurality of pulse measurements on each of said plurality of pulses utilizing said transition times and said pulse type indication.

44. (Amended) A method for generating a pulse data structure for storage in a memory apparatus operationally coupled to a signal measurement system, said data structure comprising a plurality of signal pulse characteristics of [a subset of] pulses of an previously-acquired time-varying analog [acquired] signal samples of which are stored [as acquisition data] in an acquisition memory of the signal measurement system, the method comprising the steps of:

1) automatically performing a series of pulse measurements on a previously-acquired time-varying analog signal comprising a plurality of pulses, samples of which are stored in the acquisition memory; and

2) generating for storage in an accessible data structure pulse characteristics of each of the plurality of pulses, wherein for each of the plurality of pulses, said pulse characteristics comprise results of the one or more pulse measurements.

[1) performing a plurality of pulse measurements on each said pulse of said acquired signal utilizing one or more transition times, said acquisition data, and a pulse train type indicator; and

2) storing results of said plurality of pulse measurements in the pulse data structure such that said results are associated with a unique identifier of each said pulse of said acquired signal.]